



Photo: Jelkmann

Current research topics

- Research on the life-cycle and propagation of the bacterial fire blight pathogen to develop control strategies
- Functional genomic studies on beneficial antagonistic bacteria
- Application of next generation sequencing and bioinformatics to detect bacteria, phytoplasmas, and viruses in plant environments
- Differentiation and characterization of viruses and phytoplasmas from grapevine, tree- and soft-fruit with molecular and serological tools
- Development of DNA- and protein-based diagnostic protocols to detect viruses, phytoplasmas, bacteria, insects and fungi in fruit crops and grapevine
- Investigations of the biology, population dynamics, and vectoring efficiency of phloem feeding insects transmitting virus- and phytoplasma-diseases of fruit crops and grapevine and of potential vectors of xylem-restricted bacteria
- Long term studies on the diversity and epidemiology of fungal pathogens in viticulture from the propagation process to the vineyard
- Development of procedures to minimize copper application and of alternative substances to control the important fungal diseases in organic fruit production and viticulture
- Development of phytosanitary measures directed at apple scab by the use of yeast extracts to prevent ascospore discharge from leaf litter due to enhanced microbial activity and feeding activity of earthworms
- Investigation of chemically mediated communication between cultivated plants, microorganisms, and insects by means of chemical signals, so-called infochemicals
- Development of innovative measures for pest monitoring and mass trapping (infochemical traps), and use of pheromones and allelochemicals
- Impact of fundamental determinants of climate change on the interaction between pests and diseases and cultivated plants
- Investigations on the occurrence of the spotted wing drosophila (*Drosophila suzukii*), its population dynamics, the damage it causes, counter measures and the enhancement of beneficial insects in fruit orchards by habitat management
- Alternative environmentally sound methods to control cherry fruit flies (*Rhagoletis cerasi*, *R. cingulata*)
- Safeguarding of predatory mites in vineyards, e.g. *Typhlodromus pyri*, in order to prevent outbreaks of phytophagous mites
- Influence of landscape elements, greencover crops and pruning systems on the functional biodiversity of vineyards with special emphasis on the biological control of pest species like grape berry moths (*Lobesia botrana*, *Eupoecilia ambiguella*).

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 Institute of Plant Protection in Fruit Crops and Viticulture

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Dossenheim

Travelling by car

Motorway A5 (Frankfurt - Heidelberg), take exit Dossenheim and head for Dossenheim, after about 300 m turn left in direction Schwabenheimer Hof (see figure above)

Travelling by train

Heidelberg Main Station (Hauptbahnhof), take a taxi or we meet you if it is arranged with us ahead

Siebeldingen

Travelling by Car

Motorway A65, take exit Landau-Nord; drive on B10 towards Pirmasens/Saarbrücken; turn off at Siebeldingen-Birkweiler; drive towards Siebeldingen, turn right before the railway crossing. After 700 m turn left towards Frankweiler; leaving the village of Siebeldingen you find

Editorial and Layout:

Dr. Gerlinde Nachtigall and Anja Wolck (JKI)

The Julius Kühn-Institut (JKI) is a research institution as well as a higher federal authority under the jurisdiction of Germany's Federal Ministry of Food, and Agriculture (BMEL).





The Institute at a glance

The Institute for Plant Protection in Fruit Crops and Viticulture is one of 17 specialized institutes that comprise the Julius Kühn Institute (JKI). Research on fruit crops is undertaken at Dossenheim while at Siebeldingen (Geilweilerhof), the focus is on viticulture. The Institute farms 30 hectares of experimental land (24 ha of fruit crops and 6 ha of vineyards). A unique feature is a two hectare apple research orchard in an isolated location at "Kirschgartshausen", which is used in field trials with *Erwinia amylovora*, the causal agent of fire blight. To address particular questions in steep-slope grapevine research a 1.5 ha vineyard is managed at Bernkastel-Kues/Moselle.

A total of about 60 staff members work on problems and solutions to protect fruit crops and vines from pests and diseases, in both integrated and organic production systems. A wide spectrum of techniques is used to investigate insects and microorganisms (bacteria, phytoplasmas, fungi, viruses and viroids), their interactions with each other, and with their host plants. Moreover, the Institute participates in the education of laboratory technicians and horticulturists specialized in fruit production.

JKI scientists are engaged in national and international collaboration with numerous universities and other research organizations. At Siebeldingen a close cooperation exists between the JKI-Institute for Grapevine Breeding, in Bernkastel-Kues with the Centre for Steep Vineyards of the Dienstleistungszentrum Ländlicher Raum (DLR) Moselle, while Dossenheim works closely together with the JKI-Institute for Biological Control in Darmstadt. The latter will move to Dossenheim after completion of a new building that will hold both institutes.



Main focus

The tasks of the Institute are guided by the German Plant Protection Act and related legal regulations. The Institute advises the Federal Ministry of Food and Agriculture on all matters of plant protection and plant health in the field of fruit crops and viticulture. It takes part in the registration procedure for plant protection products within national and EU wide legal regulations. Research activities and regulatory functions are closely interrelated.

Current examples are control strategies for the spotted wing drosophila, control of *Erwinia amylovora* (fire blight) and *Xylella fastidiosa*, control of grapevine trunk diseases (mostly Esca) caused by different fungi or control of viruses and phytoplasma diseases like *Flavescence dorée* on grapevine. The Institute organizes and hosts nationally and internationally specialized meetings on specific plant protection problems that are of particular concern.

Plant protection challenges in fruit crops and grapevine

Plant protection in fruit crops and grapevine is an ongoing challenge. A changing climate increases the risk of thermophilic pathogens and pests invading Central European growing areas. At the same time international trade results in movement of harmful invasive non-native species. Advanced and rapid detection methods for new pathogens and pests are needed, as well as investigations on epidemiology, pathogenicity and containment. Changes in cultural practices also result in new areas of research.



These include organic production, advanced roofing technologies of orchards and cultivation protection nets, structural changes due to the intensification of land management or the abandonment of difficult locations, such as steep vineyards.

The sustainable use of plant protection products requires innovative non-chemical strategies to control harmful organisms. Examples include improved forecasting models and the facilitation of environmentally safe practices and plant protection concepts for organic and integrated production. In perennial fruit crops and vines it is of particular importance to use high quality and healthy planting material free of graft transmissible viral and phytoplasmal diseases. Such measures minimize the requirements of plant protection in successive growing years.

Institute scientists provide expertise in all these areas. They advise national and international organizations and working panels in the formulation of regulations and guidelines on plant health and work closely with the European and Mediterranean Plant Protection Organization (EPPO) and the International Plant Protection Convention (IPPC) on standardized diagnostic protocols for specific pests and pathogens.

